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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Werner Bensch

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EXAMINER

HU, SHOUXIANG

ART UNIT

PAPER NUMBER

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/586,946	<b>Applicant(s)</b> BENSCH, WERNER	
	<b>Examiner</b> Shouxiang Hu	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 18-28 is/are pending in the application.
- 4a) Of the above claim(s) 21-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 18-21 are objected to because of the following informalities and/or defects:

In claim 18, the term of "a first of said active zone" should read as: --a first active zone from said active zones--.

Appropriate correction is required.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show which/where are the respective tunnel diode(s) and active regions (other than AZn) as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

Art Unit: 2811

consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 18-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 18 recites the combination of subject matters that the recited tunnel diode has a band gap greater than the underlying active zone and that the recited absorption layer is grown on the underlying active zone. However, the original disclosure lacks an adequate description about such combination of subject matters, especially regarding: whether the recited absorption layer is formed directly on (i.e., in contact with) the underlying active zone or through a tunnel diode (as what appears to be the case in Fig.

Art Unit: 2811

4). And, if the latter is true (i.e., grown through the tunnel diode), it is not clear whether such tunnel diode still has a band gap greater than the underlying active zone.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 18-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 recites the term of "the lower active zone", but it lacks a sufficient antecedent basis in the claim; and/or, the claim fails to clarify whether the recited lower active zone is definitely the recited "a first of said active zone".

Claim 18 recites the subject matter of "to correspond to the intensity of other active zones", but fails to clarify in what sense and/or to what degree the intensity of the light emitted by the recited active zone is definitely adjusted so as to definitely correspond to the intensity of other active zones; and/or, it is not clear whether it (by the term of "correspond") means the former is greater or small or equal to the latter.

Regarding claim 20, a broad range or limitation (such as "GaInP") together with a narrow range or limitation (such as "suitable compositions") that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as

Art Unit: 2811

to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). Similar indefiniteness also exists for each of the recited terms of: AlGaAs, AlInGaP, and GaInAlN.

***Claim Rejections - 35 USC § 102 and/or § 103***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2811

9. Claims 18-20, insofar as being in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wanlass (Wanlass et al., US 2006/0162768 A1).

Wanlass discloses a semiconductor structure (Fig. 12) with active zones in the form of a multi-wavelength diode, comprising:

a substrate (198) with at least two active zones (at least the pn junction portions in 196, 194 and 192), each of which absorbs radiation of a different wavelength, the lowest active zone (196) being grown on a surface of the substrate, the other upper active zones (at least the junction portions in 194 and 192) being epitaxially grown on the lowest active zone, and the active zones (in 196, 194 and 192) being serially connected from the lowest active zone to the uppermost active zone (in 192) via at least one dividing layer (in 206, 204; TUNNEL JUNCTION, which is naturally a tunnel diode with a reciprocally polar np or pn junction) that can naturally serve as a low-impedance resistor, one or more additional active zones (in 194) being epitaxially grown between the lowest active zone (in 196) and the uppermost active zone (in 192), the lowest active zone (in 196) having a low energetic band gap and each of the subsequent active zones (in 194 and 192) having a higher energetic band gap than a previous active zone, and the semiconductor materials used for growing or epitaxing the tunnel diodes (206, 204) having an indirect band junction or an energetic band gap, which in each case is higher than the semiconductor materials (in 196) that are used beneath it,

wherein an absorption layer (the non-junction portion in 194 and/or 192; for example, the very top portion or upper portion of the n-type material in 194 and/or 192,

Art Unit: 2811

which can naturally function as a absorption layer to absorb photons of certain wavelengths) as it has the same material as the underlying pn layer (i.e., a pn junction portion, such as the region that is at and/or very near the dashed line in region 192 or 194) of the active zone.

And, it is noted that any potential process implications regarding how the absorption layer and/or the active zone are formed, and/or whether they are formed in one step or multiple steps, are process limitations, which would not carry patentable weight in this claim drawing to a structure, because distinct structure is not necessarily produced. In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985).

It is also noted that the recited limitations of “adjusts intensity of light emitted by the active zone” and “to correspond to the intensity of other active zones” are intended use limitations. However, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In this case, the above identified active zones each can naturally function (at least to a certain degree) as a light-emitting active zone, provided it is forward-biased, as they each have a pn junction therein; and the above identified absorber layer can naturally adjusts (at least to a certain degree) the intensity of light emitted by the active zone on which the absorption layer is grown to correspond to the intensity of other active zones, given that the above identified absorber layer has the same material as the above identified underlying pn layer (or portion) of the active zone.



Furthermore, it is noted that the terms of “light emitting” and “emits a defined number of light wave-lengths” have not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Or, in the alternative, although Wanlass does not expressly disclose that the device shown in Fig. 12 can also be used as a device for emitting light, it is noted that the invention of Wanlass has its applications including pn-junction-based light-emitting diode (see the abstract); and that one of the ordinary skill in the art would readily recognize that the structure shown in Fig. 12 of Wanlass can be readily used to form a light-emitting diode device with plurality of pn-junction-based light-emitting active zones being connected in series through the tunnel junctions/diodes therebetween, so as to form a multi-wave-length light-emitting device.

Therefore, it would have been obvious to one of the ordinary skill in the art at the time in the invention was made to make a light-emitting device based on the structure shown in Fig. 12 of Wanlass, i.e., with a plurality of pn-junction-based light-emitting active zones being connected in series through the tunnel junctions/diodes

Art Unit: 2811

therebetween, so that a light-emitting device that can emit lights of multi-wave-lengths would be obtained.

Regarding claim 19, the material of the above substrate is InP.

Regarding claim 20, the material of at least one of the above active zones contains GaInP (in 196).

### ***Response to Arguments***

10. Applicant's arguments filed on 5/04/2009 have been fully considered but they are not persuasive. And, responses to them have been fully incorporated into the claim rejections set forth above in the office action.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2811

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Friday, 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Shouxiang Hu/  
Primary Examiner, Art Unit 2811